

ReMedy – new solutions in civilizational disease diagnostics and therapy.

We live under constant stress. Similarly, our body cells are continuously exposed to various stress factors. Psychological stress and cellular stress are two different things, however. Cellular stress is a condition where the cell is affected by various unfavourable factors, such as free radicals, high temperature, radiation, pathogens, the presence of certain substances, or simply the ageing process. In such a situation, the cell either dies or triggers a sequence of internal processes as a result of which it is able to adapt to new conditions. Interestingly, these processes often lead to greater resistance to stress and to increased vitality of the cell. Can these natural intercellular processes, therefore, be harnessed to design new drugs?

Professor Agnieszka Chacińska and Professor Maria Magda Konarska, winners of the second competition in the International Research Agendas (IRAP) programme, funded under the Smart Growth Operational Programme, are convinced that they can. In order to develop more efficacious therapy forms and methods of fighting contemporary civilizational diseases using the cellular adaptation mechanisms, both researchers will open a new interdisciplinary research unit – **ReMedy** – at the Centre for New Technologies at the University of Warsaw. They have obtained PLN 35 million for that purpose from the Foundation for Polish Science. The Medical University of Göttingen will be the foreign partner institution for the project. The German partner will not only offer research support, but also – even more importantly – will supply the organizational model and help in networking with the industry, which is essential for product marketing. “The new entity, which will be created as part of the ReMedy project, will bring together excellent researchers and will focus on comprehensive and mutually complementary studies of living organisms, whose goal will be to understand stress-induced cellular adaptation on a molecular and biochemical level and its use to fight diseases in humans,” says Professor Magda Konarska, Deputy Director of ReMedy institute.

“Our existing knowledge about living cells and organisms is quite fragmented. Therefore, many devastating diseases still remain incurable. In the ReMedy programme, our goal is to understand the holistic function of cells, focusing on molecular and cellular processes and their reconstruction under stressful or pathological conditions, in order to be able to offer new therapies. By establishing the new institute, we hope to create a vibrant centre for researchers and scholars to promote creativity, innovation and collaboration, while maintaining the highest scientific and organizational standards and ensuring productivity. We believe that collaboration is the key to success, along with unified efforts by various individuals with diverse interests and expertise,” adds Professor Agnieszka Chacińska, ReMedy Director.

The results of research work to be carried out at ReMedy are expected to have practical applications in two areas of public health which currently represent the greatest medical and social challenges in developed countries. The first area is that of currently untreatable age-related and neurodegenerative diseases and pathologies. The other one is cancer. As regards neurodegenerative and age-related diseases, their underlying cause is a disruption of the

homeostasis (balance) of proteins in the cells and damage to mitochondria. The knowledge acquired at the ReMedy institute will make it possible to activate internal regenerative molecular and biochemical pathways which will prevent and/or revert age-related neurodegeneration. The opposite is the case with cancers – cancer cells are highly resistant to stress, which makes them very durable. This property is destructive for the body and often leads to death. The knowledge acquired as a result of the studies to be undertaken at ReMedy will open new avenues for treatment strategies consisting in blocking the adaptation pathways opened in cancer cells.

In summary, a holistic and systemic overview of the cellular stress response will translate into important discoveries, making it possible to apply for patent protection and to introduce new effective therapies into the market.

Who are the founders of ReMedy?



AGNIESZKA CHACIŃSKA – Ordinary Professor of Biological Sciences and Head of the Mitochondrion Biogenesis Laboratory at the Centre for New Technologies at the University of Warsaw. In her research work, she has mainly focused on the biogenesis of mitochondria and the role of this process in cellular health and disease. She graduated in Biology from the University of Warsaw, specializing in Molecular Biology. She defended her Ph.D. and habilitation theses at the Institute of Biochemistry and Biophysics of the Polish Academy of Sciences. She has worked at the University of Basel in Switzerland, at the Max Planck Research Institute in Halle, Germany and at the University of Freiburg in Germany. Between 2009 and 2017 she worked at the International

Institute of Molecular and Cell Biology. She is a corresponding member of the Polish Academy of Sciences and winner of several prestigious scholarships and research awards, including: The Prime Minister Award, Nicolas Copernicus Science Award, the Award of the Minister of Science and Higher Education, and the Award of the President of the Polish Academy of Sciences. She has authored more than 70 publications in international research journals and has been cited more than 4,000 times.



MARIA MAGDA KONARSKA – a University of Warsaw Professor; since 2015 she has been Head of the RNA Biology Laboratory at the Centre for New Technologies at the University of Warsaw and Professor Emeritus of Rockefeller University in New York, USA, where she spent 26 years as the head of the Molecular Biology and Biochemistry Lab. She specializes in researching the function of RNA in cellular processes and in particular in the pre-mRNA splicing mechanism. She graduated in Genetics from the University of Warsaw and was later awarded the Ph.D. and habilitation degrees at the Institute of Biochemistry and

Biophysics of the Polish Academy of Sciences. During her scientific career she has worked for such institutions as the Center for Cancer Research of the Massachusetts Institute of Technology in Cambridge, USA and Rockefeller University in New York. She is a corresponding member of the Polish Academy of Sciences and winner of numerous Polish and international scholarships, grants and research awards. She is the author of 59 publications in international research journals and has been cited more than 5,800 times.

Photos:

- *Professor Agnieszka Chacińska – photo by Marcin Mizerski for the International Institute of Molecular and Cell Biology*
- *Professor Magda Konarska – photo from private archives*